JCB
THE JOURNAL OF CELL BIOLOGY
VOL. 186, NO. 1, JULY 13, 2009

NEWS

In This Issue

2
- Building memories with actin
- Brain-repairing cells follow trail of GABA
- Calcium channel roundup
  M. Leslie

In Focus

3
- For chromosomes, equality means segregation
  M. Leslie

People & Ideas

4
- Marian Walhout: Transcriptional mapmaker
  B. Short

REVIEWS

Comments

7 Neuronal activity moves protein palmitoylation into the synapse
Matthew B. Dalva

RESEARCH ARTICLES

Articles

11 Synchronizing chromosome segregation by flux-dependent force equalization at kinetochores
Irina Matos, António J. Pereira, Mariana Lince-Faria, Lisa A. Cameron, Edward D. Salmon, and Helder Maiato

27 The nucleolar RNA methyltransferase Misu (NSun2) is required for mitotic spindle stability
Shobbir Hussain, Sandra Blanco Benavente, Elisabete Nascimento, Ilaria Dragoni, Agata Kurowski, Astrid Gillich, Peter Humphreys, and Michaela Frye

41 Organelle tethering by a homotypic PDZ interaction underlies formation of the Golgi membrane network
Debrup Sengupta, Steven Truschel, Collin Bachert, and Adam D. Linstedt

57 The *Drosophila* afadin homologue Canoe regulates linkage of the actin cytoskeleton to adherens junctions during apical constriction
Jessica K. Sawyer, Nathan J. Harris, Kevin C. Slep, Ulrike Gaul, and Mark Peifer

75 Suppression of RhoG activity is mediated by a syndecan 4–synectin–RhoGDI1 complex and is reversed by PKCα in a Rac1 activation pathway
Arye Elfenbein, John M. Rhodes, Julia Meller, Martin A. Schwartz, Michiyuki Matsuda, and Michael Simons

85 Different Rho GTPase–dependent signaling pathways initiate sequential steps in the consolidation of long-term potentiation
Christopher S. Rex, Lulu Y. Chen, Anupam Sharma, Jihua Liu, Alex H. Babayan, Christine M. Gall, and Gary Lynch

99 Quantitative proteomics identifies a Dab2/integrin module regulating cell migration
Anjali Teckchandani, Natalie Toida, Jake Goodchild, Christine Henderson, Julian Watts, Bernd Wollscheid, and Jonathan A. Cooper

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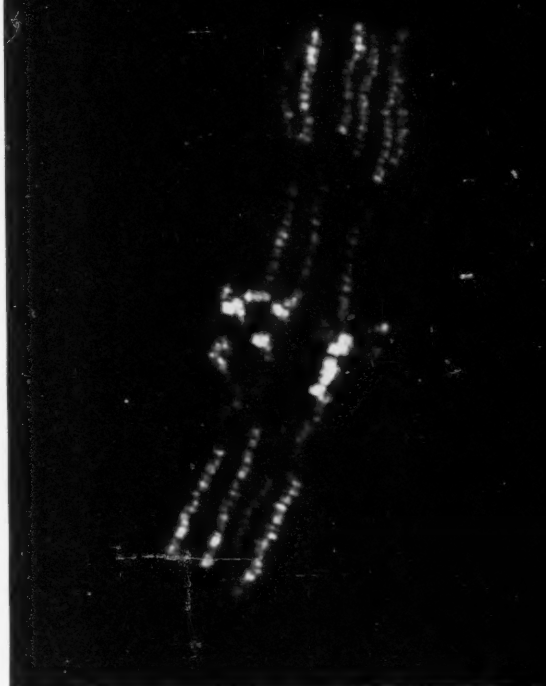


On the cover

A time-compressed image of a *Drosophila* cell's kinetochores during mitosis. Kinetochore positions in metaphase and late anaphase are represented in white, while their movements during anaphase are shown over time from red to blue. The kinetochores move synchronously because microtubule flux distributes tension equally across the mitotic spindle.
See page 11.

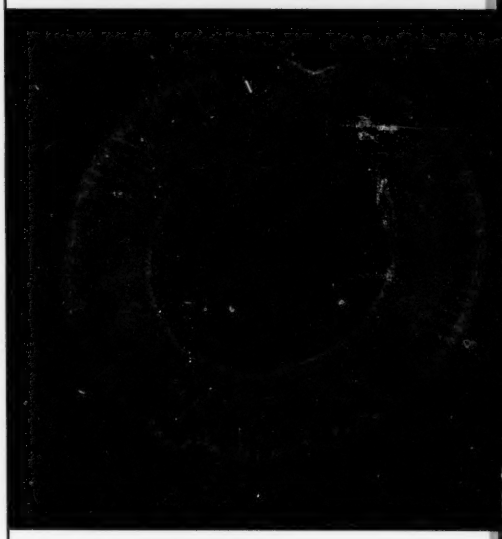
113 Ca^{2+} signaling evoked by activation of Na^+ channels and Na^+/Ca^{2+} exchangers is required for GABA-induced NG2 cell migration
Xiao-ping Tong, Xiang-yao Li, Bing Zhou, Wanhua Shen, Zhi-jun Zhang, Tian-le Xu, Shumin Duan

129 Maturation of active zone assembly by *Drosophila* Bruchpilot
Wernher Fouquet, David Owald, Carolin Wichmann, Sara Mertel, Harald Depner, Marcus Dyba, Stefan Hallermann, Robert J. Kittel, Stefan Eimer, and Stephan J. Sigrist

147 Mobile DHHC palmitoylating enzyme mediates activity-sensitive synaptic targeting of PSD-95
Jun Noritake, Yuko Fukata, Tsuyoshi Iwanaga, Naoki Hosomi, Ryouhei Tsutsumi, Naoto Matsuda, Hideki Tani, Hiroko Iwanari, Yasuhiro Mochizuki, Tatsuhiko Kodama, Yoshiharu Matsuura, David S. Bredt, Takao Hamakubo, and Masaki Fukata

Corrections

161 Loss of spindle assembly checkpoint–mediated inhibition of Cdc20 promotes tumorigenesis in mice
Min Li, Xiao Fang, Zhubo Wei, J. Philippe York, and Pumin Zhang



Mesoderm invagination fails in *Drosophila* embryos that completely lack a cell–cell junction protein called Canoe. Junctions still form (red) but lose their connection to actin and myosin (green), so cytoskeletal constriction is no longer coupled to cell shape changes.
See page 57.

JCB
THE JOURNAL OF CELL BIOLOGY
VOL. 186, NO. 2, JULY 27, 2009

NEWS

In This Issue

164 • Preventing the nuclear envelope from getting on a roll
• Calcium's route to freedom
• Killing the β-catenin messenger
M. Leslie

In Focus

165 • HIV uses autophagy for its own means
N. LeBrasseur

People & Ideas

166 • Matt Gibson: The blueprints of tissue architecture
B. Short

REVIEWS

Comments

169 The Cirque du Soleil of Golgi membrane dynamics
Vytas A. Bankaitis

RESEARCH ARTICLES

Reports

173 The CENP-S complex is essential for the stable assembly of outer kinetochore structure
Miho Amano, Aussie Suzuki, Tetsuya Hori, Chelsea Backer, Katsuya Okawa, Iain M. Cheeseman, and Tatsuo Fukagawa

183 Recruitment of functionally distinct membrane proteins to chromatin mediates nuclear envelope formation in vivo
Daniel J. Anderson, Jesse D. Vargas, Joshua P. Hsiao, and Martin W. Hetzer

193 SUMOylation of nuclear actin
Wilma A. Hofmann, Alessandro Arduini, Samantha M. Nicol, Carlos J. Camacho, James L. Lessard, Frances V. Fuller-Pace, and Primal de Lanerolle

201 Essential requirement for two-pore channel 1 in NAADP-mediated calcium signaling
Eugen Brailoiu, Dev Churamani, Xinjiang Cai, Michael G. Schrlau, G. Cristina Brailoiu, Xin Gao, Robert Hooper, Michael J. Boulware, Nae J. Dun, Jonathan S. Marchant, and Sandip Patel

211 Lysophosphatidic acid acyltransferase 3 regulates Golgi complex structure and function
John A. Schmidt and William J. Brown

219 Activity of the β-catenin phosphodestruction complex at cell–cell contacts is enhanced by cadherin-based adhesion
Meghan T. Maher, Annette S. Flozak, Adam M. Stocker, Anjen Chenn, and Cara J. Gottardi

Articles

229 A ZYG-12–dynein interaction at the nuclear envelope defines cytoskeletal architecture in the *C. elegans* gonad
Kang Zhou, Melissa M. Rolls, David H. Hall, Christian J. Malone, and Wendy Hanna-Rose

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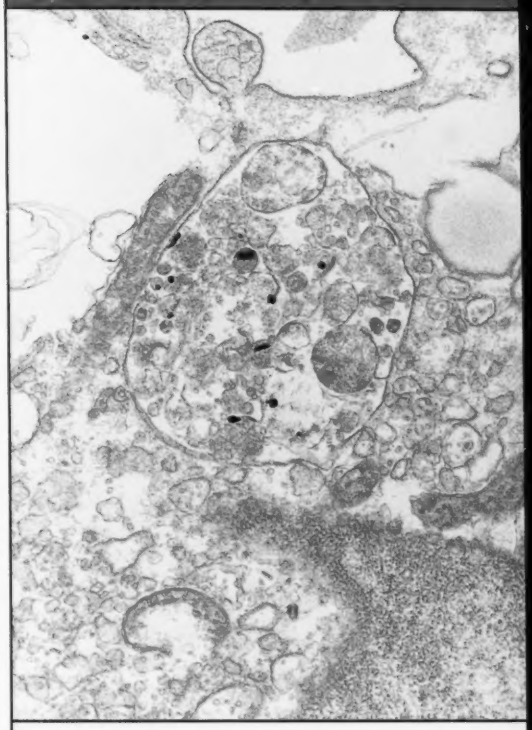


On the cover

HIV particles localize to intracellular compartments labeled with the autophagy marker LC3. Rather than being destroyed by this degradative pathway, HIV uses it to increase viral production.
See page 255.

243 Cohesin regulates *VSG* monoallelic expression in trypanosomes
David Landeira, Jean-Mathieu Bart, Daria Van Tyne, and Miguel Navarro

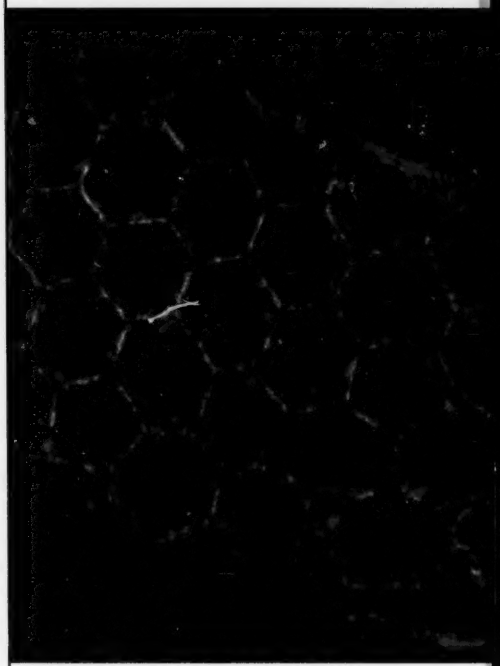
255 Autophagy pathway intersects with HIV-1 biosynthesis and regulates viral yields in macrophages
George B. Kyei, Christina Dinkins, Alexander S. Davis, Esteban Roberts, Sudha B. Singh, Chunsheng Dong, Li Wu, Eiki Kominami, Takashi Ueno, Akitsugu Yamamoto, Maurizio Federico, Antonito Panganiban, Isabelle Vergne, and Vojo Deretic

269 Membrane proteins follow multiple pathways to the basolateral cell surface in polarized epithelial cells
Glen A. Farr, Michael Hull, Ira Mellman, and Michael J. Caplan

283 An outer arm dynein light chain acts in a conformational switch for flagellar motility
Ramila S. Patel-King and Stephen M. King

Corrections

297 PI-3K and Akt are mediators of AP-1 induction by 5-MCDE in mouse epidermal Cl41 cells
Jingxia Li, Haobin Chen, Moon-Shong Tang, Xianglin Shi, Shantu Amin, Dhimant Desai, Max Costa, and Chuanshu Huang



Short microtubules (red) nucleate from germ cell membranes (green) to determine the cellular and tissue architecture of the *C. elegans* gonad.
See page 229.

JCB
THE JOURNAL OF CELL BIOLOGY
VOL. 186, NO. 3, AUGUST 10, 2009

NEWS

In This Issue

300 • Both routes to cell death necessary
• Dystrophin makes a new connection
• *Chlamydomonas* does the lopsided wave
M. Leslie

In Focus

301 • From gene manager to traffic cop
M. Leslie

People & Ideas

302 • Marc Freeman: Fishing for the function of fly glia
R. Williams

Feature

305 • Cell biologists *expand* their networks
B. Short

REVIEWS

Comments

313 The H2BK123Rgument
John A. Latham and Sharon Y.R. Dent

Analysis

317 Evolution of complexity in the integrin adhesome
Ronen Zaidel-Bar

RESEARCH ARTICLES

Reports

323 Regulated Ire1-dependent decay of messenger RNAs in mammalian cells
Julie Hollien, Jonathan H. Lin, Han Li, Nicole Stevens, Peter Walter, and Jonathan S. Weissman

333 piRNAs mediate posttranscriptional retroelement silencing and localization to pi-bodies in the *Drosophila* germline
Ai Khim Lim, Liheng Tao, and Toshie Kai

343 A role of histone H3 lysine 4 methyltransferase components in endosomal trafficking
Zhuojin Xu, Qiang Gong, Bin Xia, Benjamin Groves, Marc Zimmermann, Chris Mugler, Dezhi Mu, Brian Matsumoto, Matthew Seaman, and Dzwokai Ma

355 The role of BH3-only protein Bim extends beyond inhibiting Bcl-2–like prosurvival proteins
Delphine Mérino, Maybelline Giam, Peter D. Hughes, Owen M. Siggs, Klaus Heger, Lorraine A. O'Reilly, Jerry M. Adams, Andreas Strasser, Erinna F. Lee, Walter D. Fairlie, and Philippe Bouillet

363 Dystrophin is a microtubule-associated protein
Kurt W. Prins, Jill L. Humston, Amisha Mehta, Victoria Tate, Evelyn Ralston, and James M. Ervasti

On the cover

Prins et al. find that dystrophin—the protein affected in Duchenne muscular dystrophy—binds microtubules (green), which are disorganized in the muscle fibers of mice lacking dystrophin (top) compared to wild-type fibers (bottom).
See page 363.

Articles with related stories in the IN THIS ISSUE section have page numbers in RED; articles related to IN FOCUS have page numbers in BLUE; articles with COMMENTS have page numbers in GREEN.

371 Histone H2BK123 monoubiquitination is the critical determinant for H3K4 and H3K79 trimethylation by COMPASS and Dot1
Shima Nakanishi, Jung Shin Lee, Kathryn E. Gardner, Jennifer M. Gardner, Yoh-hei Takahashi, Mahesh B. Chandrasekharan, Zu-Wen Sun, Mary Ann Osley, Brian D. Strahl, Sue L. Jaspersen, and Ali Shilatifard

Articles

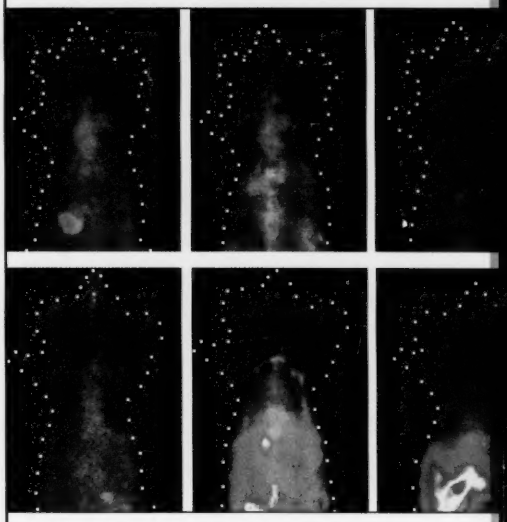
379 Phosphoregulation of the budding yeast EB1 homologue Bim1p by Aurora/Ipl1p
Tomasz Zimniak, Katharina Stengl, Karl Mechtler, and Stefan Westermann

393 Real-time in vivo imaging of $p16^{Ink4a}$ reveals cross talk with p53
Kimi Yamakoshi, Akiko Takahashi, Fumiko Hirota, Rika Nakayama, Naozumi Ishimaru, Yoshiaki Kubo, David J. Mann, Masako Ohmura, Atsushi Hirao, Hideyuki Saya, Seiji Arase, Yoshio Hayashi, Kazuki Nakao, Mitsuru Matsumoto, Naoko Ohtani, and Eiji Hara

409 Self-organization of keratin intermediate filaments into cross-linked networks
Chang-Hun Lee and Pierre A. Coulombe

423 Multiparametric analysis of focal adhesion formation by RNAi-mediated gene knockdown
Sabina E. Winograd-Katz, Shalev Itzkovitz, Zvi Kam, and Benjamin Geiger

437 Asymmetry of inner dynein arms and inter-doublet links in *Chlamydomonas* flagella
Khanh Huy Bui, Hitoshi Sakakibara, Tandis Movassagh, Kazuhiro Oiwa, and Takashi Ishikawa



Bioluminescence imaging reveals that the stress sensor $p16^{Ink4a}$ is induced after mice are treated with a DNA damaging agent (top row). The response is accelerated in mice lacking p53 (bottom row), indicating crosstalk between the two tumor suppressors.
See page 393.

JCB
THE JOURNAL OF CELL BIOLOGY
VOL. 186, NO. 4, AUGUST 24, 2009

NEWS

In This Issue

448 • Peroxisome inheritance at the right time and place
• Myosin drives bladder movements
• Ubiquitin drives cilia shortening
B. Short and E. Choi

In Focus

449 • Aurora B answers an XIST-ential question
B. Short

People & Ideas

450 • Alexander Meissner: Learning the reprogramming code
B. Short

Feature

453 • Super-coil me: Sizing up centromeric nucleosomes
E. Hill and R. Williams

REVIEWS

Comments

457 Endocytosis of lipid-anchored proteins: excluding GEECs from the crowd
Ben Nichols

Reviews

461 Bringing KASH under the SUN: the many faces of nucleo-cytoskeletal connections
David Razafsky and Didier Hodzic

RESEARCH ARTICLES

Reports

473 A requirement for epsin in mitotic membrane and spindle organization
Zhonghua Liu and Yixian Zheng

481 Motor domain phosphorylation and regulation of the *Drosophila* kinesin 13, KLP10A
Vito Mennella, Dong-Yan Tan, Daniel W. Buster, Ana B. Asenjo, Uttama Rath, Ao Ma, Hernando J. Sosa, and David J. Sharp

Articles

491 AURKB-mediated effects on chromatin regulate binding versus release of XIST RNA to the inactive chromosome
Lisa L. Hall, Meg Byron, Gayle Pageau, and Jeanne B. Lawrence

509 Oncogene homologue Sch9 promotes age-dependent mutations by a superoxide and Rev1/Polζ-dependent mechanism
Federica Madia, Min Wei, Valerie Yuan, Jia Hu, Cristina Gattazzo, Phuong Pham, Myron F. Goodman, and Valter D. Longo

525 The BCL-2–like protein CED-9 of *C. elegans* promotes FZO-1/Mfn1,2– and EAT-3/Opa1–dependent mitochondrial fusion
Stéphane G. Rolland, Yun Lu, Charles N. David, and Barbara Conradt

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On the cover

XIST RNA (green) coats and inactivates one X chromosome (top left) but is released during mitosis (top right). Hall et al. find that Aurora B kinase regulates this association, and manipulate the kinase's activity to either release XIST during interphase (bottom left) or retain it in metaphase (bottom right).
See page 491.

541 Myosin-driven peroxisome partitioning in *S. cerevisiae*
Andrei Fagarasanu, Fred D. Mast, Barbara Knoblach, Yui Jin, Matthew J. Brunner, Michael R. Logan, J.N. Mark Glover, Gary A. Eitzen, John D. Aitchison, Lois S. Weisman, and Richard A. Rachubinski

555 The *Dictyostelium* type V myosin MyoJ is responsible for the cortical association and motility of contractile vacuole membranes
Goeh Jung, Margaret A. Titus, and John A. Hammer III

571 Cortactin regulates cofilin and N-WASp activities to control the stages of invadopodium assembly and maturation
Matthew Oser, Hideki Yamaguchi, Christopher C. Mader, J.J. Bravo-Cordero, Marianela Arias, Xiaoming Chen, Vera DesMarais, Jacco van Rheenen, Anthony J. Koleske, and John Condeelis

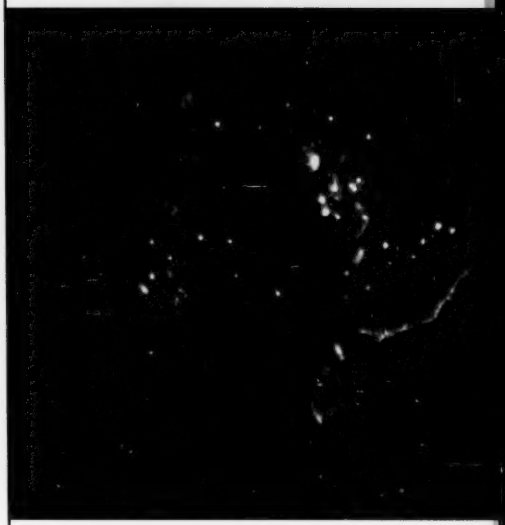
589 Crystal structure of the complete integrin αVβ3 ectodomain plus an α/β transmembrane fragment
Jian-Ping Xiong, Bhuvaneshwari Mahalingham, Jose Luis Alonso, Laura Ann Borrelli, Xianliang Rui, Saurabh Anand, Bradley T. Hyman, Thomas Rysiok, Dirk Müller-Pompalla, Simon L. Goodman, and M. Amin Arnaout

601 The ubiquitin conjugation system is involved in the disassembly of cilia and flagella
Kaiyao Huang, Dennis R. Diener, and Joel L. Rosenbaum

615 Steric and not structure-specific factors dictate the endocytic mechanism of glycosylphosphatidylinositol-anchored proteins
Pinkesh Bhagatji, Rania Leventis, Jonathan Comeau, Mohammad Refaei, and John R. Silvius

Corrections

629 RMD-1, a novel microtubule-associated protein, functions in chromosome segregation in *Caenorhabditis elegans*
Kumiko Oishi, Hideyuki Okano, and Hitoshi Sawa



Oser et al. dissect the assembly of invadopodia—actin-based membrane protrusions that degrade surrounding extracellular matrix. Bright puncta of actin barbed ends are rapidly generated in invadopodia precursors by the severing protein cofilin.
See page 571.

JCB
THE JOURNAL OF CELL BIOLOGY
VOL. 186, NO. 5, SEPTEMBER 7, 2009

NEWS

In This Issue

632 • Cytomegalovirus sticks it to MHC
• Putting the squeeze on apoptotic cells
• Stopping sister synapses
M. Leslie

In Focus

633 • Managing the breakup
M. Leslie

People & Ideas

634 • Louis Reichardt: The long climb to science's summits
N. LeBrasseur

REVIEWS

Reviews

637 Paraspeckles: nuclear bodies built on long noncoding RNA
Charles S. Bond and Archa H. Fox

RESEARCH ARTICLES

Reports

645 Identification of a novel, widespread, and functionally important PCNA-binding motif
Karin M. Gilljam, Emadoldin Feyzi, Per A. Aas, Mirta M.L. Sousa, Rebekka Müller, Cathrine B. Vågbø, Tara C. Catterall, Nina B. Liabakk, Geir Slupphaug, Finn Drabløs, Hans E. Krokan, and Marit Otterlei

655 Human Fbh1 helicase contributes to genome maintenance via pro- and anti-recombinase activities
Kasper Fugger, Martin Mistrik, Jannie Rendtlew Danielsen, Christoffel Dinant, Jacob Falck, Jiri Bartek, Jiri Lukas, and Niels Mailand

665 Interplay of Oct4 with Sox2 and Sox17: a molecular switch from stem cell pluripotency to specifying a cardiac fate
Sonia Stefanovic, Nesrine Abboud, Stéphanie Désilets, David Nury, Chad Cowan, and Michel Pucéat

675 Cells satisfy the mitotic checkpoint in Taxol, and do so faster in concentrations that stabilize syntelic attachments
Zhenye Yang, Alison E. Kenny, Daniela A. Brito, and Conly L. Rieder

685 The TRC8 E3 ligase ubiquitinates MHC class I molecules before dislocation from the ER
Helen R. Stagg, Mair Thomas, Dick van den Boomen, Emmanuel J.H.J. Wiertz, Harry A. Drabkin, Robert M. Gemmill, and Paul J. Lehner

693 P115 RhoGEF and microtubules decide the direction apoptotic cells extrude from an epithelium
Gloria Slattum, Karen M. McGee, and Jody Rosenblatt

703 TOR-mediated autophagy regulates cell death in *Drosophila* neurodegenerative disease
Tao Wang, Uyen Lao, and Bruce A. Edgar

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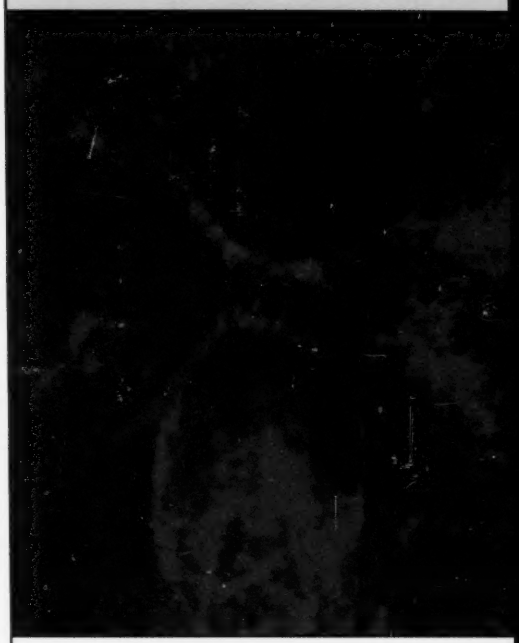


On the cover

Microtubules (green) point to an apoptotic cell in the center of an epithelial sheet, positioning a band of actin (red) and myosin II to squeeze the dying cell and its condensed chromosomes (blue) out of the monolayer.
See page 693.

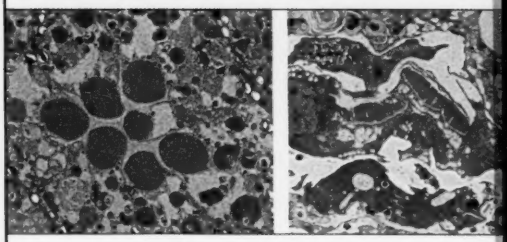
Articles

713 Pds5 is required for homologue pairing and inhibits synapsis of sister chromatids during yeast meiosis
Hui Jin, Vincent Guacci, and Hong-Guo Yu

727 Dynamics of myosin, microtubules, and Kinesin-6 at the cortex during cytokinesis in *Drosophila* S2 cells
Ronald D. Vale, James A. Spudich, and Eric R. Griffis

739 Proper timing of cytokinesis is regulated by *Schizosaccharomyces pombe* Etd1
Juan Carlos García-Cortés and Dannel McCollum

755 Translational control by RGS2
Chau H. Nguyen, Hong Ming, Peishen Zhao, Lynne Hugendubler, Robert Gros, Scot R. Kimball, and Peter Chidiac



Overexpression of the small GTPase Rheb activates the TOR pathway, resulting in degeneration of the seven photoreceptor cells in *Drosophila* eye ommatidia (right). Wang et al. demonstrate that the TOR pathway induces cell death by suppressing autophagy.
See page 703.

JCB
THE JOURNAL OF CELL BIOLOGY
VOL. 186, NO. 6, SEPTEMBER 21, 2009

NEWS

In This Issue

768 • How ER stress gives cells the CHOP
• The long and short of mitochondrial fusion
• Cell packing comes under the lens
B. Short

In Focus

769 • Rab2 directs a stop-loss program
B. Short

People & Ideas

770 • Iain Cheeseman: A strong attachment to kinetochores
B. Short

REVIEWS

Reviews

773 Coordination of membrane events during autophagy by multiple class III PI3-kinase complexes
Anne Simonsen and Sharon A. Tooze

RESEARCH ARTICLES

Reports

783 Role of ERO1-α–mediated stimulation of inositol 1,4,5-triphosphate receptor activity in endoplasmic reticulum stress–induced apoptosis
Gang Li, Marco Mongillo, King-Tung Chin, Heather Harding, David Ron, Andrew R. Marks, and Ira Tabas

793 Coassembly of Mgm1 isoforms requires cardiolipin and mediates mitochondrial inner membrane fusion
Rachel M. DeVay, Lenin Dominguez-Ramirez, Laura L. Lackner, Suzanne Hoppins, Henning Stahlberg, and Jodi Nunnari

805 The dynamin-related GTPase Drp1 is required for embryonic and brain development in mice
Junko Wakabayashi, Zhongyan Zhang, Nobunao Wakabayashi, Yasushi Tamura, Masahiro Fukaya, Thomas W. Kensler, Miho Iijima, and Hiromi Sesaki

817 Regulation of dynein-driven microtubule sliding by the axonemal protein kinase CK1 in *Chlamydomonas* flagella
Avanti Gokhale, Maureen Wirschell, and Winfield S. Sale

Articles

825 Entropic organization of interphase chromosomes
Peter R. Cook and Davide Marenduzzo

835 Nucleotide excision repair–induced H2A ubiquitination is dependent on MDC1 and RNF8 and reveals a universal DNA damage response
Jurgen A. Marteijn, Simon Bekker-Jensen, Niels Mailand, Hannes Lans, Petra Schwertman, Audrey M. Gourdin, Nico P. Dantuma, Jiri Lukas, and Wim Vermeulen

849 Ribosome stalk assembly requires the dual-specificity phosphatase Yvh1 for the exchange of Mrt4 with P0
Kai-Yin Lo, Zhihua Li, Feng Wang, Edward M. Marcotte, and Arlen W. Johnson

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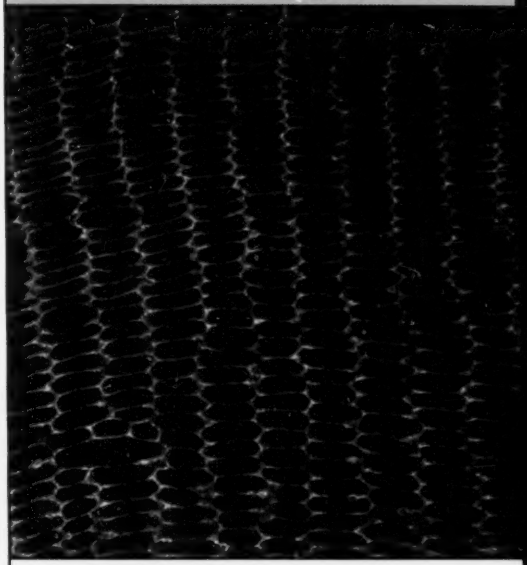

On the cover

Tropomodulin1 (green) is required for the regular hexagonal packing of mouse lens fiber cells, binding to a subpopulation of F-actin (red) that connects a spectrin-based network underlying the cell membranes.
See page 915.

863 Yvh1 is required for a late maturation step in the 60S biogenesis pathway
Stefan Kemmler, Laura Occhipinti, Maria Veisu, and Vikram Govind Panse

881 Impaired dense core vesicle maturation in *Caenorhabditis elegans* mutants lacking Rab2
Stacey L. Edwards, Nicole K. Charlie, Janet E. Richmond, Jan Hegermann, Stefan Eimer, and Kenneth G. Miller

897 UNC-108/RAB-2 and its effector RIC-19 are involved in dense core vesicle maturation in *Caenorhabditis elegans*
Marija Sumakovic, Jan Hegermann, Ling Luo, Steven J. Husson, Katrin Schwarze, Christian Olendrowitz, Liliane Schoofs, Janet Richmond, and Stefan Eimer

915 Tropomodulin1 is required for membrane skeleton organization and hexagonal geometry of fiber cells in the mouse lens
Roberta B. Nowak, Robert S. Fischer, Rebecca K. Zoltoski, Jerome R. Kuszak, and Velia M. Fowler

Corrections

929 Recruitment of functionally distinct membrane proteins to chromatin mediates nuclear envelope formation in vivo
Daniel J. Anderson, Jesse D. Vargas, Joshua P. Hsiao, and Martin W. Hetzer

Wakabayashi et al. demonstrate a critical function for the dynamin-related GTPase Drp1 in embryonic development. Mitochondria (green) form highly elongated networks in cells lacking Drp1 (right) compared to the short, fragmented mitochondria of wild-type cells (left).
See page 805.